REMARKS

Claims 1 to 22 are pending. Claim 21 has been withdrawn from consideration. Claims 1, 10, 20 and 22 are currently amended.

Claims 1, 10, 20 and 22 were amended to replace the terms "the synthesis of" with "synthesizing" in response to the § 112 rejection in the Office Action.

Claims 1, 10, 20 and 22 were amended to include the term "continuous". Support for this amendment can be found on page 5, lines 12-21 of the present application.

Entry of the amendments and reconsideration of the present application are respectfully requested.

§ 112 Rejections

Claims 1-20 and 22 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 1, 10, 20, and 22 has been amended to replace the terms "the synthesis of" with the terms "synthesizing".

In summary, Applicants submit that the rejection of claims 1-20 and 22 under 35 USC § 112, second paragraph, has been overcome, and that the rejection should be withdrawn.

§ 102 Rejections

Claim 20 is rejected under 35 USC § 102(b) as being anticipated by WO 97/22825 (Neukermans). Applicants submit that amended independent claim 20 is novel over this reference.

Claim 20 provides a continuous method for synthesizing an array of polymers. The continuous method includes providing an array of sealed flexible polymeric pouches. Each sealed flexible polymeric pouch contains a same first reactant and a same second reactant such that a first sealed flexible polymeric pouch and a second sealed flexible polymeric pouch each contain a similar volume ratio of a first reactant to a second reactant. Each of the sealed flexible polymeric pouches is attached to a conveyance apparatus. The continuous method includes conveying the array of sealed flexible polymeric pouches through a reaction zone exposing the first sealed flexible polymeric pouch to a first set of reaction conditions and exposing the second sealed flexible

polymeric pouch to a second set of reaction conditions. The first set of reaction conditions is different than the second set of reaction conditions. The reaction conditions cause the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

Neukermans discloses a microfluidic valve(s) and an integrated microfluidic system. The microfluidic valve is used to control the flow of a liquid through an elongated capillary that is enclosed along at least one surface by a layer of a malleable material (page 3, line 37 - page 4, line 2 of Neukermans). The microfluidic valve includes a valve housing, an electrically powered actuator, and a blade. A pouch having a layer of malleable material is used with the microfluidic valve (page 4, lines19 - 22 of Neukermans).

In the Office Action, the Examiner has asserted that Neukermans discloses a method for synthesizing an array of polymers in the abstract and on pages 20-21. However, Neukermans teaches a single microfluidic system integrating a polymerase chain reaction (PCR) technique used in amplifying a minute amount of nucleotide material at page 20, lines 30-32. Neukermans does not teach or suggest a continuous method for synthesizing an array of polymers.

The Examiner has asserted that Neukermans discloses providing an array of sealed flexible polymeric pouches in figures 3 - 4 where the pouches are elements 124a, 124b and 124c and/or 122. However, Neukermans teaches a single substantially planar pouch as described on page 9, line 30 – page 10, line 2 and page 13, line 23 – page 14, line 5 having elements 124a, 124b, and 124c and 122. Neukermans refers to elements 124a, 124b, and 124c as liquid filled reservoirs and element 122 as a reaction chamber such that the liquid filled reservoirs 124a, 124b, 124c and the reaction chamber 122 are located within a single substantially planar pouch 106 and not as individual pouches. The liquid residing in the liquid filled reservoirs 124a, 124b, and 124c can be metered into the reaction chamber 122 using microfluidic valves. The Examiner has further asserted that the pouches are elements 128 connected in series between processing chamber 198 in figure 11. However, Neukermans teaches valves 128 rather than elements 128 connected in series between reaction chambers 198. The valves 128 can provide flow control for the liquids flowing through or between reaction chambers 198. Neukermans does not teach or suggest providing an array of sealed flexible polymeric pouches.

The Examiner has asserted that Neukermans discloses each pouch attached to a conveyance apparatus at Figure 3 and elements 158a, 158b, 158c or alternatively, elements 128a, 128b, and 128c. However, Neukermans teaches in Figure 3 and at page 15, line 26 – page 16, line 10 that elements 158a, 158b, and 158c are filling nozzles for filling liquid reservoirs 124a, 124b, and 124c. Figure 3 displays a single substantially planar pouch 106 containing filling nozzle 158a, 158b, and 158c for filling liquid reservoirs 124a, 124b, and 124c. The single substantially planar pouch 106 of Neukermans is positioned on a base plate 102 and the single substantially planar pouch 106 is not attached to a conveying apparatus, but rather a stationary base plate 102. Nuekermans does not teach or suggest each sealed flexible polymeric pouch of the present invention attached to a conveyance apparatus.

The Examiner has asserted that Neukermans discloses conveying the array of sealed flexible polymeric pouches through a reaction zone exposing the first pouch to a first set of reaction conditions and exposing the second pouch to a second set of reaction conditions and cause the first reactant in each pouch to react with the second reactant in each pouch to produce an array of polymers in Figure 11, processing chambers 198, and at page 21, last paragraph and lines 26-27. However, Neukermans teaches in Figure 11 and at page 21, lines 22-33 that processing chambers 198 of a single substantially planar pouch 106 can be periodically temperature cycled between two PCR temperatures, and the liquid within the single substantially planar pouch 106 can be shuttled between the processing chambers 198 by opening and closing valves, while maintaining the two processing chambers 198 at the two selected PCR temperatures. In the present invention, the first reactant and the second reactant of the first sealed flexible pouch are exposed to a first set of reaction conditions which are different than the second set of reaction conditions selected for the first reactant and the second reactant of the second sealed flexible pouch. Neukermans rather teaches flowing liquids retained within a single pouch positioned on a base plate 102 between reaction chambers having different temperatures to amplify a nucleotide material. Neukermans does not teach or suggest conveying an array of sealed flexible polymeric pouches through a reaction zone to cause the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

Rather, Neukermans teaches a microfluidic valve for controlling the flow of liquids through a single substantially planar pouch located in a microfluidic system. The single substantially planar

pouch is formed from two laminated sheets (Figure 6) of Neukermans comprising reservoirs, capillaries, junctures, a reaction chamber and a common capillary. The liquids in the single pouch of Neukermans are conveyed within the single pouch from reservoirs by adjusting the microfluidic valves of the microfluidic system. Neukermans describes liquids which are conveyed from more than one reservoir using external microfluidic valve(s) to control the flow of the liquids into the capillaries flowing into a reaction chamber of the single pouch rather than physically conveying or moving one pouch from a first location to a second location. Neukermans does not describe or suggest more than one sealed flexible polymeric pouch being conveyed through a reaction zone as described in the present invention. Neukermans does not disclose a first sealed flexible polymeric pouch having a first reactant and a second reactant such that the first and second reactants react in the first sealed flexible polymeric pouch under a first set of reaction conditions for forming a first polymer, and a second sealed flexible polymeric pouch having a first reactant and a second reactant such that the first and second reactants react in the second sealed flexible polymeric pouch under a second set of conditions for forming a second polymer in a continuous method of the present invention.

For at least the foregoing reasons, Neukermans does not disclose or suggest each and every feature of the present invention, and the rejection of claim 20 under 35 USC § 102(b) as being anticipated by Neukermans should now be withdrawn.

§ 103 Rejections

Claims 1-20 and 22 are rejected under 35 USC § 103(a) as being unpatentable over WO 97/22825 (Neukermans) in view of McPherson et al. (PCR, M.J. McPherson and S.G. Moller, BIOS Scientific Publishers, Oxford 2000, pages 9-21, and 67-87). Independent claims 1, 10, 20, and 22 have been amended. Pending dependent claims 2-9 are dependent on amended independent claim 1. Pending dependent claims 11-19 are dependent on amended independent claim 10.

Claim 1 provides a continuous method for synthesizing an array of polymers. The continuous method includes providing an array of sealed flexible polymeric pouches. Each sealed flexible polymeric pouch contains a same first reactant and a same second reactant such that a first sealed flexible polymeric pouch and a second sealed flexible polymeric pouch each contain a

different volume ratio of a first reactant to a second reactant. Each of the sealed flexible polymeric pouches is attached to a conveyance apparatus. The continuous method includes conveying the array of sealed flexible polymeric pouches through a reaction zone to cause the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

Claim 10 provides a continuous method for synthesizing an array of polymers. The continuous method includes providing an array of sealed flexible polymeric pouches. Each sealed flexible polymeric pouch contains a same first reactant and a same second reactant such that a first sealed flexible polymeric pouch and a second sealed flexible polymeric pouch each contain a different volume ratio of a first reactant to a second reactant, and each sealed flexible polymeric pouch contains a captive pouch. Each of the sealed flexible polymeric pouches is attached to a conveyance apparatus. The continuous method includes conveying the array of sealed flexible polymeric pouches through a reaction zone to cause the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

Claim 20 has been described above.

Claim 22 provides a continuous method for synthesizing an array of polymer mixtures. The continuous method includes providing an array of sealed flexible polymeric pouches. Each sealed flexible polymeric pouch contains a same first polymer and a same second polymer such that a first sealed flexible polymeric pouch and a second sealed flexible polymeric pouch each contain a different volume ratio of a first polymer to a second polymer. Each of the sealed flexible polymeric pouches is attached to a conveyance apparatus. The continuous method includes conveying the array of sealed flexible polymeric pouches through a mixing zone to cause the first polymer in each sealed flexible polymeric pouch to react with the second polymer in each sealed flexible polymeric pouch to produce an array of polymer mixtures.

In regards to claim 1, Neukermans does not describe or suggest a continuous method comprising an array of sealed flexible polymeric pouches each attached to a conveyance apparatus. Neukermans does not disclose each pouch having a same first reactant and a same second reactant such that at least one pouch of the array of sealed flexible polymeric pouches contains a different volume ratio of first reactant to second reactant. Neukermans does not

describe or suggest conveying the array of sealed flexible polymeric pouches through a reaction zone to cause the first reactant in each pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

In regards to claim 10, Neukermans does not describe or suggest a continuous method comprising an array of sealed flexible polymeric pouches each attached to a conveyance apparatus. Neukermans does not disclose each sealed flexible polymeric pouch having a same first reactant and a same second reactant such that at least one sealed flexible polymeric pouch of the array of sealed flexible polymeric pouches contains a different volume ratio of first reactant to second reactant, and each sealed flexible polymeric pouch contains a captive pouch. Neukermans does not describe or suggest conveying the array of sealed flexible pouches through a reaction zone to cause the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

In regards to claim 20, Neukermans does not describe or suggest a continuous method comprising an array of sealed flexible polymeric pouches each attached to a conveyance apparatus. Neukermans does not disclose each sealed flexible polymeric pouch having a same first reactant and a same second reactant such that at least one sealed flexible polymeric pouch of the array of sealed flexible polymeric pouches contains a similar volume ratio of the first reactant to the second reactant. Neukermans does not describe or suggest conveying the array of sealed flexible polymeric pouches through a reaction zone exposing the first sealed flexible pouch to a first set of reaction conditions and exposing the second sealed flexible polymeric pouch to a second set of reaction conditions such that the first set of reaction conditions are different than the second set of reaction conditions, and causing the first reactant in each sealed flexible polymeric pouch to react with the second reactant in each sealed flexible polymeric pouch to produce an array of polymers.

In regards to claim 22, Neukermans does not describe or suggest a continuous method comprising an array of sealed flexible polymeric pouches each attached to a conveyance apparatus. Neukermans does not disclose each sealed flexible polymeric pouch having a same first polymer and a same second polymer such that at least one sealed flexible polymeric pouch contains a similar volume ratio of first polymer to second polymer. Neukermans does not describe or suggest conveying the array of sealed flexible polymeric pouches through a reaction

zone to cause the first polymer in each sealed flexible polymeric pouch to interact with the second polymer in each sealed flexible polymeric pouch to produce an array of polymer mixtures.

The addition of McPherson et al. does not overcome the deficiencies of Neukermans (i.e., Neukermans doesn't teach nor suggest all of the claim limitations of the present invention). McPherson describes a polymerase chain reaction (PCR) as a technique for in vitro amplification of specific DNA sequences by the simultaneous primer extension of complimentary strands of DNA to produce numerous copies of DNA (page 1 of McPherson). With respect to claims 1, 10, 20 and 22 of the present invention, McPherson doesn't teach or suggest a continuous method for synthesizing an array of polymers or polymer mixtures in individually sealed flexible polymeric pouches (e.g., synthesizing 10, 30, 90 different polymers in 10, 30, or 90 separately sealed flexible polymeric pouches as recited in claims 4-6, respectively, of the present invention) connected to a conveyance apparatus such that each of the sealed flexible polymeric pouches is conveyed through a reaction zone. As similarly described for Neukermans, McPherson also does not teach or suggest the claim elements described in claims 1, 10, 20 and 22 of the present invention. Neukermans in view of McPherson does not overcome the fundamental lack of a prima facie case of obviousness. Applicants request that the rejection of claims 1-20 and 22 under 35 USC § 103(a) as being unpatentable over Neukermans in view of McPherson be withdrawn.

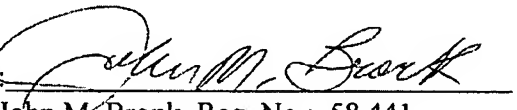
For the various reasons set forth above, the pending claims are not obvious over Neukermans in view of McPherson. The rejection of claims 1-20, and 22 under 35 USC § 103(a) as being unpatentable over Neukermans in view of McPherson has been overcome and should be withdrawn.

CONCLUSION

In view of the above, it is respectfully submitted that pending claims 1-20 and 22, as amended, are in condition for allowance. If any issues or questions remain, the resolution of which the Examiner feels would be advanced by a conference with the Applicant's agent, the Examiner is invited to contact the agent at the telephone number noted below.

Respectfully submitted,

March 5, 2008
Date

By: 
John M. Bronk, Reg. No.: 58,441
Telephone No.: 651-733-8383

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833